Project: Greens Bayou

SUMMARY OF LABORATORY TEST RESULTS

Contract No. DACW64-95-D-0007 Delivery Order No. 0047

Boring No. 97-87

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing #4	#10	#40	#100	#200	Torvane Shear Strength (tsf)	q u (tsf)
1	0 - 2	2.50		Sandy Clay,w/grass roots,Very stiff,Gray & Brown	C L	20.2											
2	2 - 4	1.75		Sandy Clay,Stiff,Gray	C L	14.8											
3	4 - 6	1.75		Sandy Clay,w/calc & fer nod,Stiff,Gray	C L	14.9	108.7	125.0	30.0	16.0	98.4	94.3	87.9	83.1	67.7		1.17
4	6 - 8	2.50		Sandy Clay,w/calc & fer nod,Very stiff,Gray & Yellowish gray	C L	15.0											
5	8 - 10	2.00		Sandy Clay,w/calc & fer nod,Very stiff,Gray & Yellowish gray	C L	17.5											
6	10 - 12	2.50		Clay,w/sand seams,Very stiff,Red & Gray	C H	22.1											
7	12 - 14	3.50		Clay,w/fer nod & sand seams,Very stiff,Red & Gray	C H												
8	14 - 16	4.5+		Clay,w/fer nod & sand seams,Hard,Red & Gray	C H	17.7											
9	16 - 18	4.5+		Clay,w/fer nod & sand seams,Hard,Red & Gray	C H	17.9											
10	18 - 20	3.00		Silty Clay,Very stiff,Brown & Gray	C L	18.7	104.5	124.0	31.0	20.0	100.0	100.0	99.9	99.5	88.7		2.40
11	20 - 22	4.00		Clay,w/silt seams,Very stiff,Red & Gray	C H	25.0											
12	22 - 24	4.5+		Clay,w/calc nod & silt seams,Hard,Red & Gray	C H	24.4											
13	24 - 26	3.75		Silty Clay,Very stiff,Red & gray	C L	24.2	97.9	121.6	28.0	20.0							
14	26 - 28			Silty Sand,Very dense,Reddish brown	S M	24.1					100.0	100.0	100.0	74.1	32.9		
15	28-29.5		74	Silty Sand,Very dense,Reddish brown	S M	21.6											
16	32-34	4.25		Clay,w/calc nod & fer stains,slks,Hard,Red & Gray	C H	22.6											
17	34-36	4.5+		Clay,w/calc nod & fer stains,slks,Hard,Red & Gray	C H	22.5											
18	36-38	4.5+		Clay,w/calc nod & fer stains,slks,Hard,Red & Gray	C H	21.0	103.0	124.7	59.0	22.0							
19	38-40	4.5+		Clay,w/calc nod & fer stains,slks,Hard,Red & Gray	C H	21.5											
20	40-42	4.5+		Clay,w/calc nod & fer stains,slks,Hard,Red & Gray	C H	16.1											

S # : Sample Number, P P : Pocket Penetrometer Reading, U S C : Unified Soil Classifcation, M c : Moisture Content
q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe

oject: Greens Bayou

SUM OF LABORATORY TEST RESULTS

Contract No. DACW64-95-D-0007 Delivery Order No. 0047

Boring No. 97-87

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing #4	#10	#40	#100	#200	Torvane Shear Strength (tsf)	q u (tsf)
21	42-44	4.5+		Silty Clay,w/silt seams,Hard,Red & Gray	C L	16.5	110.4	128.6	43.0	19.0							
22	44-46	3.00		Silty Clay,Very stiff,Brown	C L	19.3											
23	46-48	2.50		Silty Clay,w/fer nod,Very stiff,Red & Gray	C L	21.5											
24	48-50			Silt,Reddish brown & gray	M L	18.7											
25	50-52	4.25		Silty Clay,Hard,Reddish brown	C L	20.6											
26	52-54	4.5+		Clay,w/calc nod,Hard,Red & Gray	C H	21.5											
27	54-56	4.50		Clay,w/calc nod,Hard,Red & Gray	C H	18.3	108.6	128.4	55.0	21.0	99.7	96.9	94.5	93.9	92.3		3.82
28	56-58	1.00		Silty Clay,w/calc nod,Stiff,Gray	C L	18.2											
29	58-60	3.25		Silty Clay,w/calc nod,Very stiff,Gray & Brown	C L	15.4											

9

S # : Sample Number, P P : Pocket Penetrometer Reading, U S C : Unified Soil Classifcation, M c : Moisture Content
q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe

SIEVE ANALYSIS

PROJECT: GREENS BAYOU

BORING: 97-87 SAMPLE: 7 DF: PR0998A .DAT
DEPTH: 12-14 DATE: 28 APR 98

LL: 50 PL: 17 PI: 33 GS: .00 WC: .00
CLASSIFICATION: 200
SANDY CLAY (CH), REDDISH BROWN

TOTAL WEIGHT OF SAMPLE: .0 gms.
PARTIAL WEIGHT AFTER SPLIT: 51.7 gms.

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	No 4	4.750	100.0	.0
.0	No 6	3.350	100.0	.0
.0	No 10	2.000	100.0	.0
.0	No 16	1.180	100.0	.0
.0	No 20	.850	100.0	.0
.0	No 30	.600	100.0	.0
.1	No 40	.425	99.8	.2
.1	No 50	.300	99.8	.2
.4	No 70	.212	99.2	.8
1.8	No 100	.150	96.5	3.5
5.1	No 140	.106	90.1	9.9
8.9	No 200	.075	82.8	17.2

PERCENT GRAVEL = .0
PERCENT SAND = 17.2
PERCENT FINES = 82.8

EDE

JOB NO. 114008614 DATE 3/11/98

PROJECT Greens Bayou

AREA Houston, Texas

BORING NO. 97-87 SAMPLE NO. 3 DEPTH 4-6 ft

SPECIMEN NO. 1

CLASSIFICATION
Sandy Clay,w/calc & fer nod,Stiff,Gray

Tare No.	P211	Height	5.595 in.
Tare plus Wet Specimen	336.93 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	298.67 gm	Initial Area	6.290 sq in.
Water Weight	38.26 gm	Volume	35.194 cu in.
Tare Weight	42.57 gm	Volume of Solids	cu in.
Wet Specimen	1154.55 gm	Void Ratio	
Dry Specimen	1004.49 gm	Saturation	%
Water Content	14.94 %	Dry Density	108.7 lb/cu ft
Specific Gravity of Solids			

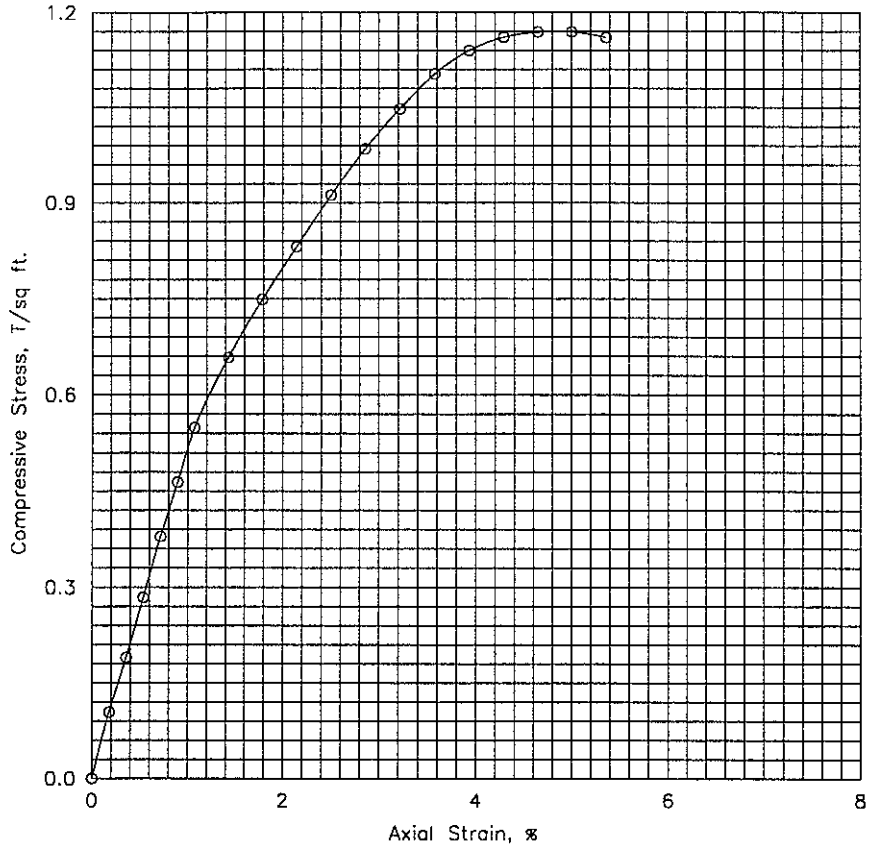
LL = 30 PL = 16 PI = 14

Proving Ring No. 10170
Proving Ring Constant, K = .757 lbs/div.

Elapsed Time min.	Dial Reading 0.001"	Cumulative Change in.	Proving Ring Dial Reading	Axial Load lb	Axial Strain	Area Corr. sq in.	Compr. Stress tsf
.0	0.	.000	.0	.0	.000	6.29	.000
.2	10.	.010	12.0	9.1	.002	6.30	.104
.4	20.	.020	22.0	16.7	.004	6.31	.190
.6	30.	.030	33.0	25.0	.005	6.32	.284
.7	40.	.040	44.0	33.3	.007	6.34	.379
.9	50.	.050	54.0	40.9	.009	6.35	.464
1.0	60.	.060	64.0	48.4	.011	6.36	.549
1.3	80.	.080	77.0	58.3	.014	6.38	.658
1.6	100.	.100	88.0	66.6	.018	6.40	.749
2.0	120.	.120	98.0	74.2	.021	6.43	.831
2.3	140.	.140	108.0	81.8	.025	6.45	.912
2.7	160.	.160	117.0	88.6	.029	6.48	.985
3.0	180.	.180	125.0	94.6	.032	6.50	1.048
3.3	200.	.200	132.0	99.9	.036	6.52	1.103
3.6	220.	.220	137.0	103.7	.039	6.55	1.140
4.0	240.	.240	140.0	106.0	.043	6.57	1.161
4.3	260.	.260	141.5	107.1	.046	6.60	1.169
4.7	280.	.280	142.0	107.5	.050	6.62	1.169
5.0	300.	.300	141.5	107.1	.054	6.65	1.160

Job No. 114008614

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.			1			
Type of Specimen			Undisturbed			
Initial	Water content	w_0	14.9 %	%	%	%
	Void ratio	e_0				
	Saturation	S_0	%	%	%	%
	Dry density, lb/cu ft	γ_d	108.7			
Time to failure, min		t_f	4.32			
Unconfined compressive strength, T/sq ft		q_u	1.17			
Undrained shear strength, T/sq ft		S_u	.58			
Sensitivity ratio		S_t				
Initial specimen diameter, in.		D_0	2.830			
Initial specimen height, in.		H_0	5.595			

Classification Sandy Clay,w/calc & fer nod,Stiff,Gray

LL	30	PL	16	PI	14	G_s	

Remarks

Project Greens Bayou

Area Houston, Texas

Boring No. 97-87 | Sample No. 3

Depth El 4-6 ft | Date 3/11/98

UNCONFINED COMPRESSION TEST REPORT

ENG FORM 1 JUN 65 3659

PLATE XI-2

Geotest Engineering, Inc.

JOB NO. 114008614 DATE 3/11/98

PROJECT Greens Bayou

AREA Houston, Texas

BORING NO. 97-87 SAMPLE NO. 10 DEPTH 18-20 ft

SPECIMEN NO. 1

CLASSIFICATION
Silty Clay,Very stiff,Brown & Gray

Tare No.	S1	Height	5.595 in.
Tare plus Wet Specimen	447.18 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	403.18 gm	Initial Area	6.290 sq in.
Water Weight	44.00 gm	Volume	35.194 cu in.
Tare Weight	167.57 gm	Volume of Solids	cu in.
Wet Specimen	1145.18 gm	Void Ratio	
Dry Specimen	964.97 gm	Saturation	%
Water Content	18.67 %	Dry Density	104.5 lb/cu ft
Specific Gravity of Solids			

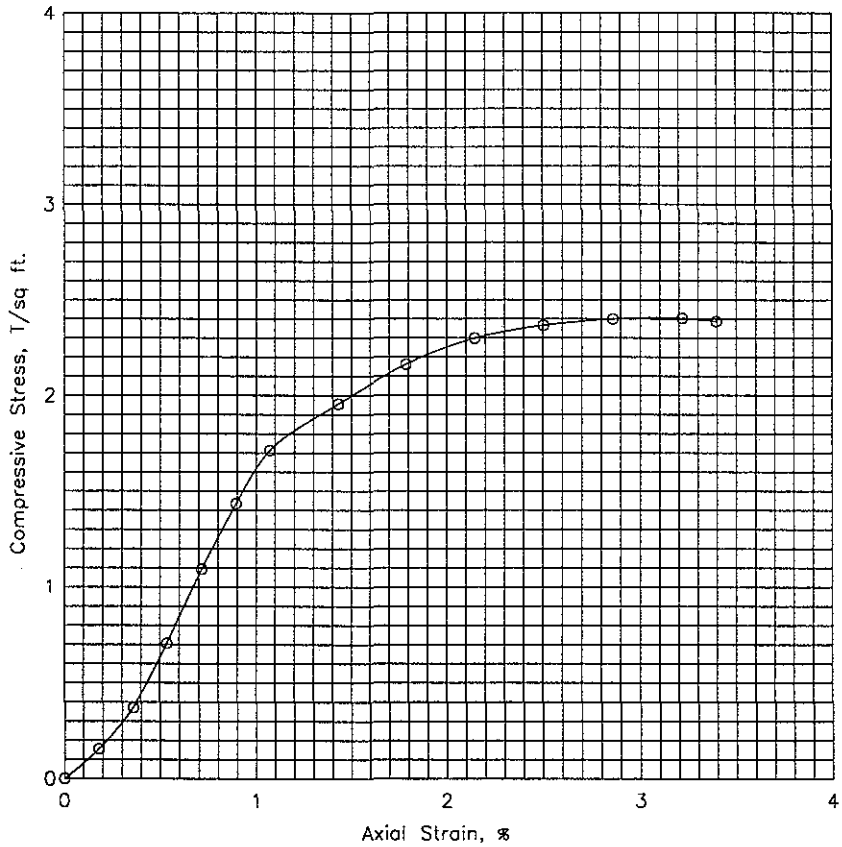
LL = 31 PL = 20 PI = 11

Proving Ring No. 10170
Proving Ring Constant, K = .757 lbs/div.

Elapsed Time min.	Dial Reading 0.001"	Cumulative Change in.	Proving Ring Dial Reading	Axial Load lb	Axial Strain	Area Corr. sq in.	Compr. Stress tsf
.0	0.	.000	.0	.0	.000	6.29	.000
.2	10.	.010	18.0	13.6	.002	6.30	.156
.3	20.	.020	43.0	32.6	.004	6.31	.371
.5	30.	.030	82.0	62.1	.005	6.32	.707
.7	40.	.040	127.0	96.1	.007	6.34	1.093
.9	50.	.050	167.0	126.4	.009	6.35	1.434
1.0	60.	.060	200.0	151.4	.011	6.36	1.714
1.3	80.	.080	229.0	173.4	.014	6.38	1.956
1.6	100.	.100	254.0	192.3	.018	6.40	2.162
2.0	120.	.120	271.0	205.1	.021	6.43	2.298
2.3	140.	.140	280.0	212.0	.025	6.45	2.365
2.6	160.	.160	285.0	215.7	.029	6.48	2.399
3.0	180.	.180	286.5	216.9	.032	6.50	2.403
3.2	190.	.190	285.0	215.7	.034	6.51	2.386

Job No. 114008614

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial: Water content	w_0	18.7 %	%	%	%
Initial: Void ratio	e_0				
Initial: Saturation	S_0	%	%	%	%
Initial: Dry density, lb/cu ft	γ_d	104.5			
Time to failure, min	t_f	2.98			
Unconfined compressive strength, T/sq ft	q_u	2.40			
Undrained shear strength, T/sq ft	S_u	1.20			
Sensitivity ratio	S_t				
Initial specimen diameter, in.	D_0	2.830			
Initial specimen height, in.	H_0	5.595			

Classification Silty Clay,Very stiff,Brown & Gray

LL	31	PL	20	PI	11	G_s	

Remarks

Project Greens Bayou

Area Houston, Texas

Boring No. 97-87 | Sample No. 10

Depth 18-20 ft | Date 3/11/98
El

UNCONFINED COMPRESSION TEST REPORT

ENG FORM 1 JUN 65 3659

PLATE XI-2

Geotest Engineering, Inc.

PLATE

JOB NO. 114008614 DATE 3/11/98

PROJECT Greens Bayou

AREA Houston, Texas

BORING NO. 97-87 SAMPLE NO. 27 DEPTH 54-56 ft

SPECIMEN NO. 1

CLASSIFICATION
Clay,w/calc nod,Hard,Red & Gray

Tare No.	S5	Height	5.595 in.
Tare plus Wet Specimen	414.31 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	375.35 gm	Initial Area	6.290 sq in.
Water Weight	38.96 gm	Volume	35.194 cu in.
Tare Weight	162.04 gm	Volume of Solids	cu in.
Wet Specimen	1186.11 gm	Void Ratio	
Dry Specimen	1002.93 gm	Saturation	%
Water Content	18.26 %	Dry Density	108.6 lb/cu ft
Specific Gravity of Solids			

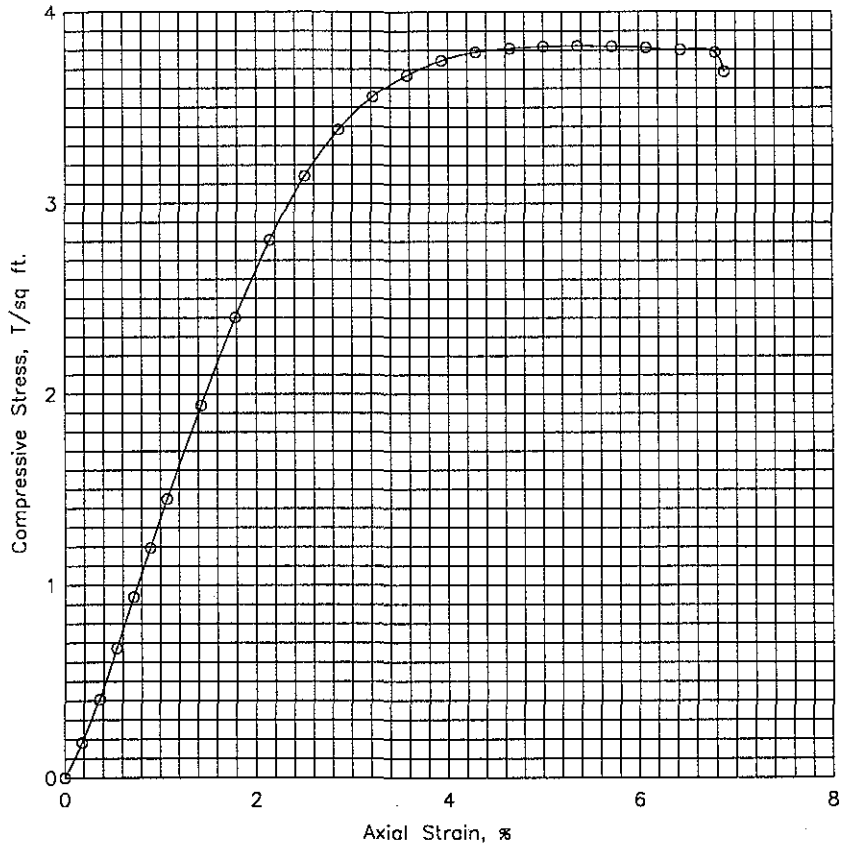
LL = 55 PL = 21 PI = 34

Proving Ring No. 10170
Proving Ring Constant, K = .757 lbs/div.

Elapsed Time min.	Dial Reading 0.001"	Cumulative Change in.	Proving Ring Dial Reading	Axial Load lb	Axial Strain	Area Corr. sq in.	Compr. Stress tsf
.0	0.	.000	.0	.0	.000	6.29	.000
.2	10.	.010	21.0	15.9	.002	6.30	.182
.4	20.	.020	47.0	35.6	.004	6.31	.406
.5	30.	.030	78.0	59.0	.005	6.32	.672
.7	40.	.040	109.0	82.5	.007	6.34	.938
.9	50.	.050	139.0	105.2	.009	6.35	1.194
1.1	60.	.060	169.0	127.9	.011	6.36	1.449
1.4	80.	.080	227.0	171.8	.014	6.38	1.939
1.7	100.	.100	282.0	213.5	.018	6.40	2.400
2.0	120.	.120	331.0	250.6	.021	6.43	2.807
2.3	140.	.140	372.0	281.6	.025	6.45	3.143
2.7	160.	.160	402.0	304.3	.029	6.48	3.384
3.0	180.	.180	424.0	321.0	.032	6.50	3.556
3.3	200.	.200	439.0	332.3	.036	6.52	3.668
3.7	220.	.220	450.0	340.7	.039	6.55	3.746
4.0	240.	.240	457.0	345.9	.043	6.57	3.790
4.3	260.	.260	461.0	349.0	.046	6.60	3.809
4.6	280.	.280	464.0	351.2	.050	6.62	3.819
4.9	300.	.300	466.0	352.8	.054	6.65	3.821
5.3	320.	.320	467.5	353.9	.057	6.67	3.819
5.6	340.	.340	468.5	354.7	.061	6.70	3.813
5.9	360.	.360	469.0	355.0	.064	6.72	3.802
6.3	380.	.380	469.0	355.0	.068	6.75	3.788
6.3	385.	.385	457.0	345.9	.069	6.75	3.687

Job No. 114008614

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.			1			
Type of Specimen			Undisturbed			
Initial	Water content	w_0	18.3 %	%	%	%
	Void ratio	e_0				
	Saturation	S_0	%	%	%	%
	Dry density, lb/cu ft	γ_d	108.6			
Time to failure, min		t_f	4.95			
Unconfined compressive strength, T/sq ft		q_u	3.82			
Undrained shear strength, T/sq ft		S_u	1.91			
Sensitivity ratio		S_t				
Initial specimen diameter, in.		D_0	2.830			
Initial specimen height, in.		H_0	5.595			

Classification Clay,w/calc nod,Hard,Red & Gray

LL	55	PL	21	PI	34	G_s	

Remarks

Project Greens Bayou

Area Houston, Texas

Boring No. 97-87 | Sample No. 27

Depth El 54-56 ft | Date 3/11/98

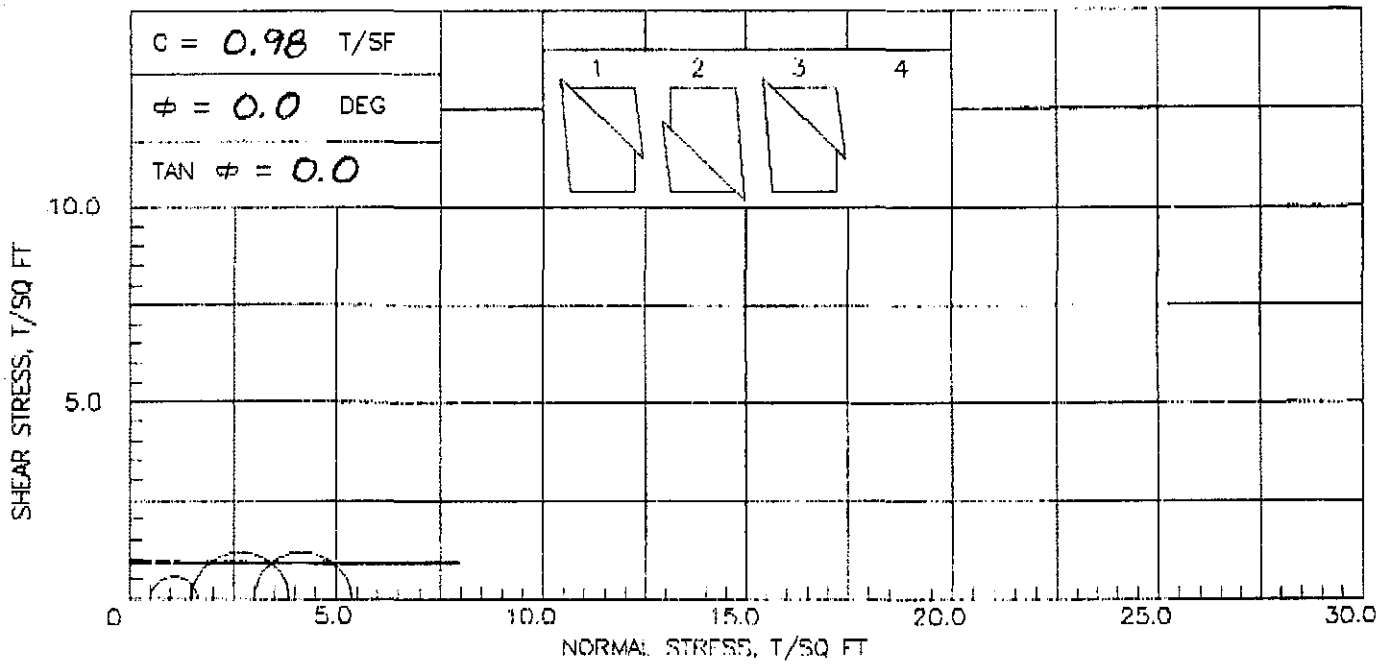
UNCONFINED COMPRESSION TEST REPORT

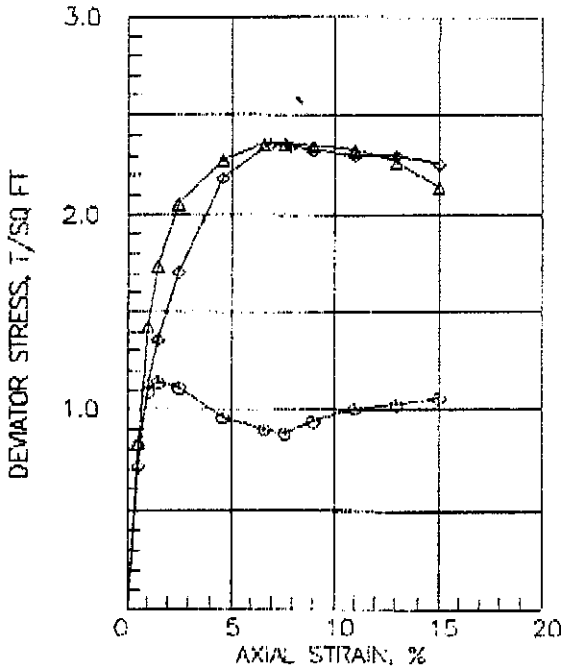
ENG FORM 1 JUN 65 3659

PLATE XI-2

Geotest Engineering, Inc.

PLATE





SPECIMEN NO.		⊙ 1	△ 2	◇ 3	4
INITIAL	WATER CONTENT, %	25.5	19.2	19.6	
	DRY DENSITY, PCF	99.6	107.7	108.1	
	SATURATION, %	99.4	91.6	94.5	
	VOID RATIO	.692	.565	.559	
BEFORE SHEAR	WATER CONTENT, %				
	DRY DENSITY, PCF				
	SATURATION, %				
	VOID RATIO				
	BACK PRESSURE, TSF				
CHAMBER PRESSURE, TSF		.50	1.50	3.00	
MAX. DEV. STRESS, TSF		1.14	2.36	2.36	
TIME TO FAILURE, MIN.		4	26	26	
STRAIN RATE INCR., %					
INITIAL DIAMETER, IN.		1.40	1.41	1.41	
INITIAL HEIGHT, IN.		3.00	3.00	3.00	

CONTROLLED-STRAIN TEST

DESCRIPTION OF SPECIMENS: SILTY CLAY (CL), BROWN

LL	PL	PI	GS 2.70 (ESTIMATED)	UNDISTURBED SPECIMEN	Q TEST

REMARKS:

PROJECT GREENS BAYOU

BORING NO. 97-87 | SAMPLE NO. 7

DEPTH/ELEV 12-14 | TECH. UCS

LABORATORY USAE WES - STF/GL | DATE 04-07-98

TRIAXIAL COMPRESSION TEST REPORT

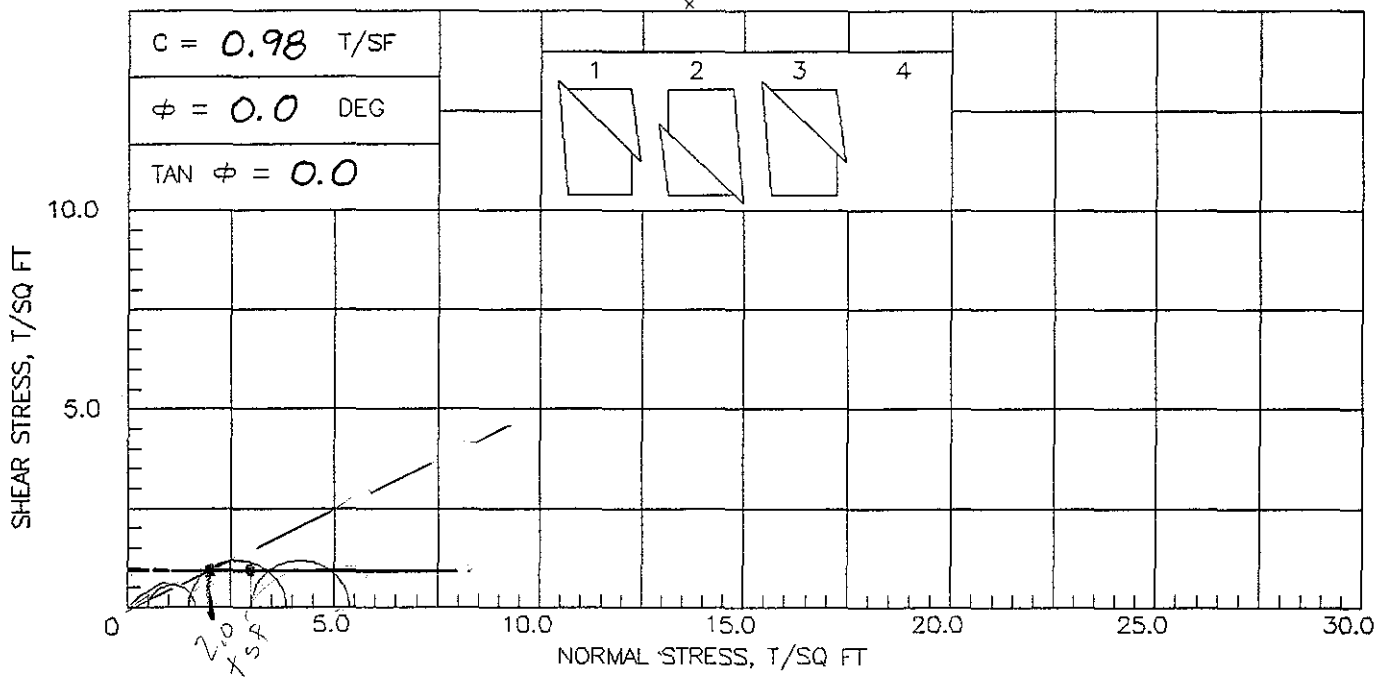
tan φ = .98/2.00
θ = 26°

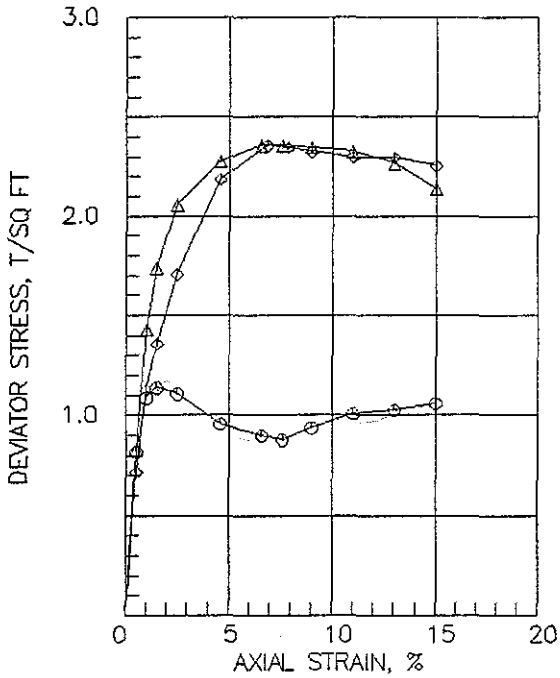
tan θ = .98/3.00
θ = 18°

C = 0.98 T/SF

φ = 0.0 DEG

TAN φ = 0.0





SPECIMEN NO.		○ 1	△ 2	◇ 3	4
INITIAL	WATER CONTENT, %	25.5	19.2	19.6	
	DRY DENSITY, PCF	99.6	107.7	108.1	
	SATURATION, %	99.4	91.6	94.5	
	VOID RATIO	.692	.565	.559	
BEFORE SHEAR	WATER CONTENT, %				
	DRY DENSITY, PCF				
	SATURATION, %				
	VOID RATIO				
	BACK PRESSURE, TSF				
CHAMBER PRESSURE, TSF		.50	1.50	3.00	
MAX. DEV. STRESS, TSF		1.14	2.36	2.36	
TIME TO FAILURE, MIN.		4	26	26	
STRAIN RATE INCR., %					
INITIAL DIAMETER, IN.		1.40	1.41	1.41	
INITIAL HEIGHT, IN.		3.00	3.00	3.00	

CONTROLLED-STRAIN TEST

DESCRIPTION OF SPECIMENS: ~~SILTY~~ SANDY CLAY (~~CL~~ H), BROWN

LL 50	PL 17	PI 33	GS 2.70 (ESTIMATED)	UNDISTURBED SPECIMEN	Q TEST

REMARKS:

PROJECT GREENS BAYOU

BORING NO. 97-87	SAMPLE NO. 7
DEPTH/ELEV 12-14	TECH. UCS
LABORATORY USAE WES - STF/GL	DATE 04-07-98

TRIAXIAL COMPRESSION TEST REPORT

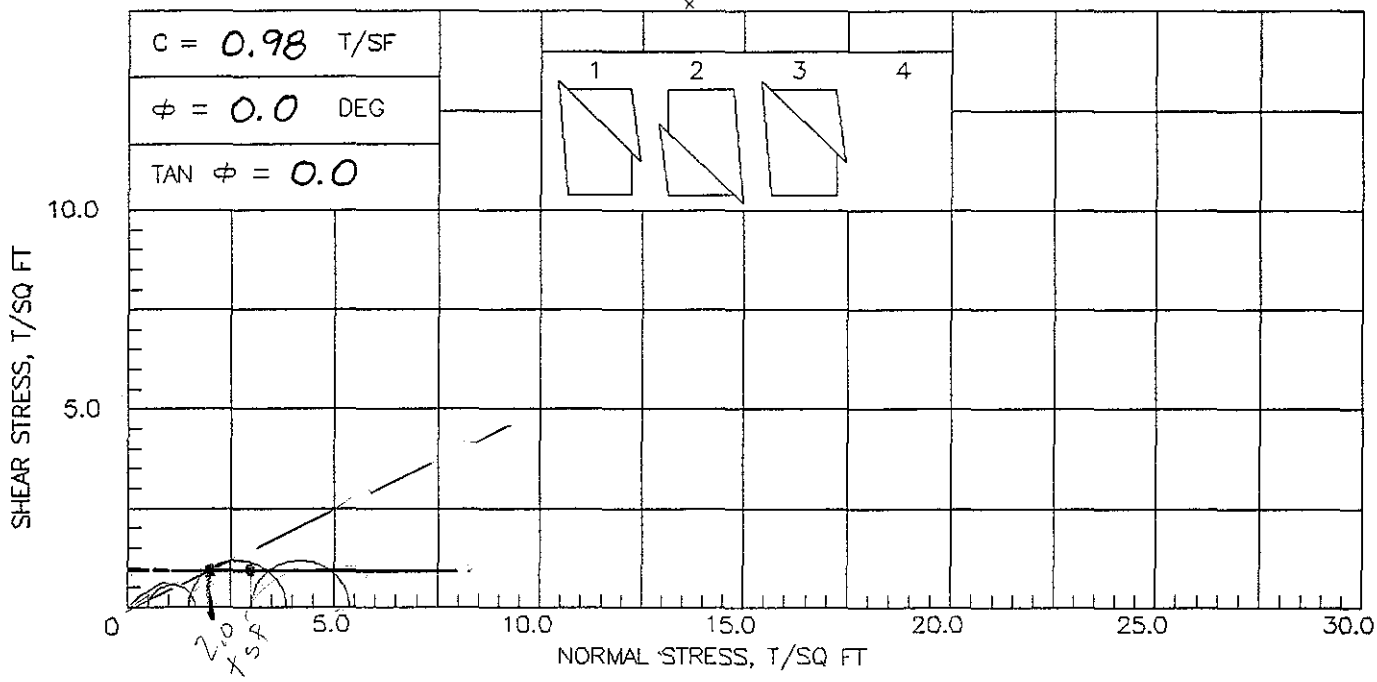
tan φ = .98/2.00
θ = 26°

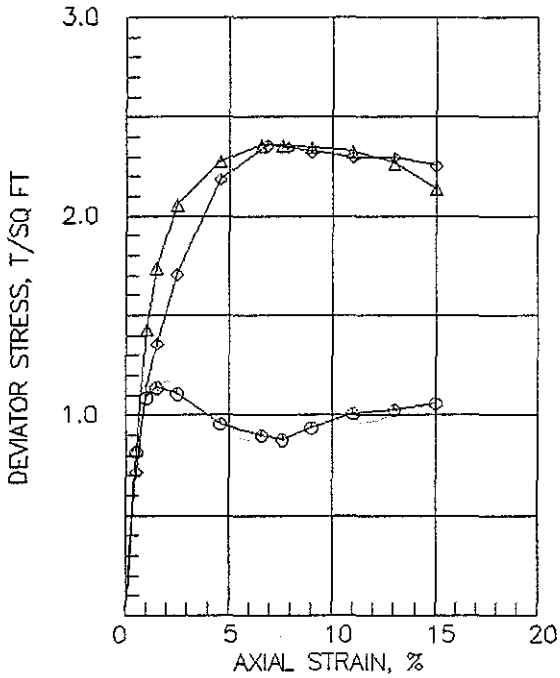
tan θ = .98/3.00
θ = 18°

C = 0.98 T/SF

φ = 0.0 DEG

TAN φ = 0.0





SPECIMEN NO.		○ 1	△ 2	◇ 3	4
INITIAL	WATER CONTENT, %	25.5	19.2	19.6	
	DRY DENSITY, PCF	99.6	107.7	108.1	
	SATURATION, %	99.4	91.6	94.5	
	VOID RATIO	.692	.565	.559	
BEFORE SHEAR	WATER CONTENT, %				
	DRY DENSITY, PCF				
	SATURATION, %				
	VOID RATIO				
	BACK PRESSURE, TSF				
CHAMBER PRESSURE, TSF		.50	1.50	3.00	
MAX. DEV. STRESS, TSF		1.14	2.36	2.36	
TIME TO FAILURE, MIN.		4	26	26	
STRAIN RATE INCR., %					
INITIAL DIAMETER, IN.		1.40	1.41	1.41	
INITIAL HEIGHT, IN.		3.00	3.00	3.00	

CONTROLLED-STRAIN TEST

DESCRIPTION OF SPECIMENS: ~~SILTY~~ SANDY CLAY (~~CL~~ H), BROWN

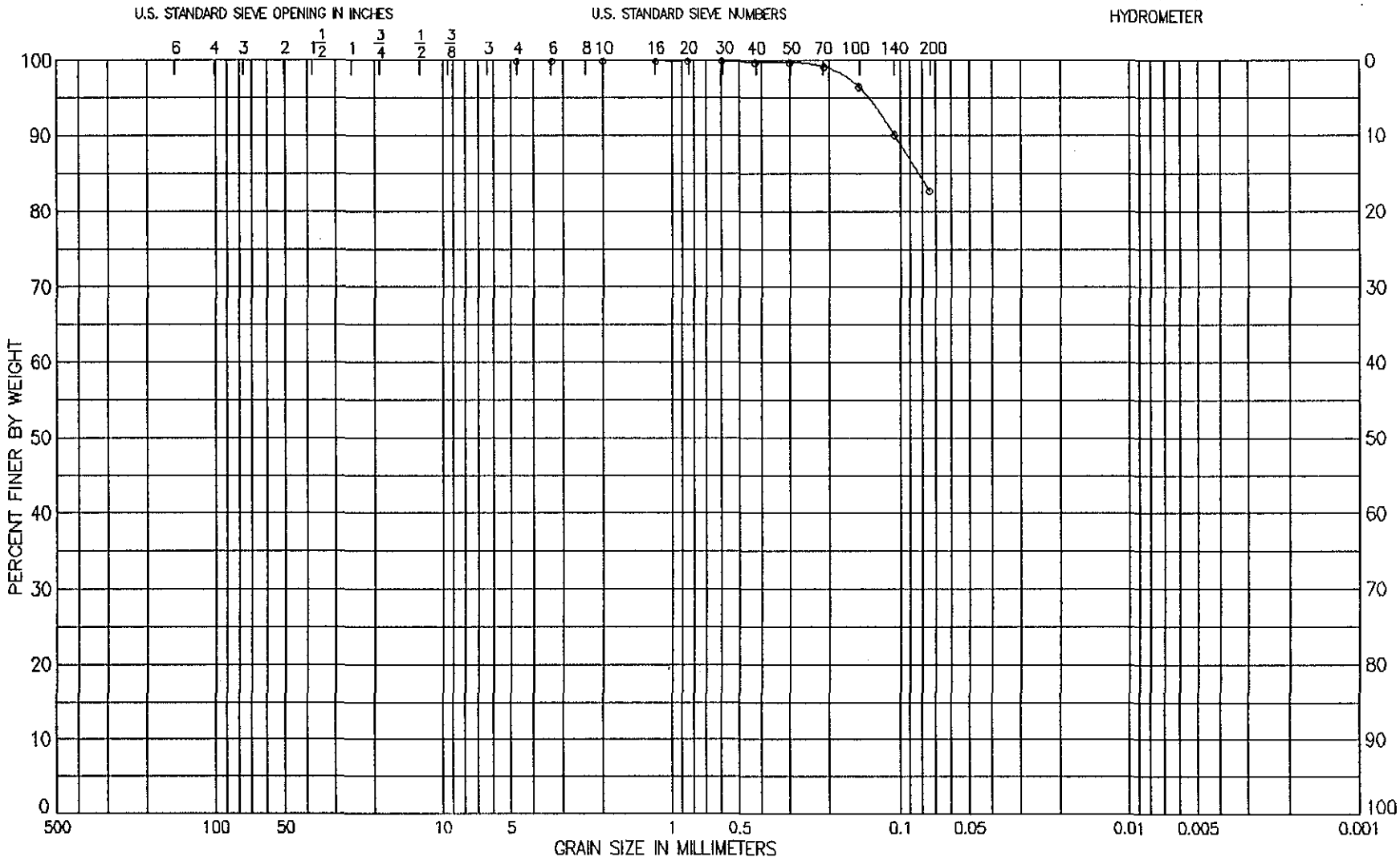
LL 50	PL 17	PI 33	GS 2.70 (ESTIMATED)	UNDISTURBED SPECIMEN	Q TEST

REMARKS:

PROJECT GREENS BAYOU

BORING NO. 97-87	SAMPLE NO. 7
DEPTH/ELEV 12-14	TECH. UCS
LABORATORY USAE WES - STF/GL	DATE 04-07-98

TRIAXIAL COMPRESSION TEST REPORT



COBBLES	GRAVEL		SAND			SILT or CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LL	PL	PI	GS	NAT W,%	ORG,%
50	17	33			

CLASSIFICATION
SANDY CLAY (CH), REDDISH BROWN

PROJECT GREENS BAYOU

BORING NO. 97-87 SAMPLE NO. 7

DEPTH/ELEV 12-14 DATE 28 APR 98

GRADATION CURVE | LABORATORY USAE WES – STF/GL